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Notes on the Classification and Taxonomy of the Testudinata.

By G. Baur, University of Chicago.

(Read before the American Philosophical Society, May 5, 1893.)

I. THE TYPE OF *HYDROMEDUSA TECTIFERA* Cope, WITH GENERAL OBSERVATIONS ON THE GENUS *HYDROMEDUSA* AND THE CLASSIFICATION OF THE *PLEURODIRA*.

Through the kindness of Prof. E. D. Cope, I have received for examination the type specimen of *Hydromedusa tectifera* Cope. The carapace is totally different from that figured by Boulenger* as *Hydromedusa tectifera*.

1. *Osteological Differences*.—In the diagnosis of *Hydromedusa* Boulenger states the number of neural bones as seven, and in the figure mentioned seven are shown. In the type specimen there are only six neural bones, allowing pleuralia 7 and 8 to meet in the middle line. The neurals are much more slender than in the specimen figured by Boulenger. The first neural is 39 mm. long and extends to the second pleural, excluding neurale 2 from pleurale 1. The first neural measures 6 mm. in front and 15 mm. behind. The second neural is only in connection with pleurale 2. The sixth neural bone is placed between the fifth and sixth pleuralia. The pleuralia 6 do not meet in the middle line, but are separated by the sixth neural and the seventh pleural of the right side, which touches the sixth pleural of the left. The first peripheral (marginal bone) is completely excluded from the second pleural; it is placed between the nuchal and the second peripheral. Notwithstanding the carapace measures over curve 29 cm. in length, it is not fully ossified; there are small fontanelles on the side between the pleurals and peripherals and also between the plastron and the peripherals.

2. *Differences in the Dermal Shields*.—The first vertebral shield is very much longer than broad (58 mm. : 31 mm.); where it meets the posterior cervical shield it is 32 mm. broad; the breadth of the posterior end of the second cervical shield is 68 mm. There cannot be any doubt that the specimen figured by Boulenger as *H. tectifera* belongs to a different species from the type. What name it ought to receive I am unable to determine.

Boulenger considers the specimen figured by Wagler† as *Hydromedusa maximiliani* and that figured by Peters‡ under the same name as identical species, which he also considers as *H. tectifera*.

There seems to be no doubt that the specimens figured by Peters and Wag-

* Boulenger, G. A., *Catalogue of the Chelonians*, London, 1889, p. 211.

† Wagler, Joh., *Natürliches System der Amphibien*, Pl. iii, Fig. 25-42, 1830.

‡ Peters, W., "Zur Osteologie der *Hydromedusa maximiliani*," *Müll. Archiv.*, 1839, pp. 280-289, Pl. xiv. I may mention here that this paper originally appeared as Peters' *Dissertatio Inauguralis*, under the title "Observationes ad Anatomiam Cheloniorum," with one plate (Berolini, 1838).

ler belong to two different species. This is at once seen from the structure of the squamosal and frontal.

In the specimen of Peters the posterior ends of the frontals are very slender and *not* connected with the very slender inner branches of the squamosals. In the specimen of Wagler the posterior ends of the frontals are well developed and *united* with the inner branches of the squamosals. There is a frontosquamosal arch in Wagler's specimen, but there is only a supraoccipito-squamosal arch in the specimen of Peters.

Unfortunately, the skull of the type of *Hydromedusa tectifera* Cope is not preserved, and it is therefore impossible to determine whether one of the specimens figured by Peters and Wagler belongs to this species. In spite of the papers of Dr. Günther and Boulenger on the subject, it is now again as undecided as ever. Further studies have to decide about it.

The characters of the genus Hydromedusa Wagler. The skull of *Hydromedusa* shows a peculiarity which separates it widely from its allied forms, *Chelys* and *Chelodina*. In *Hydromedusa* the posterior nasal openings are of enormous size and the *pterygoids* form their posterior and inner border. In other words, the palatines have no inner process at all to connect the vomer (Peters). This seems important enough to place *Hydromedusa* in a separate family, *Hydromedusidæ*, with the following characters :

Hydromedusidæ.

A slender parieto-squamosal-, or supraoccipito-squamosal arch. Posterior nasal openings bounded by maxillary, palate, pterygoid and vomer; frontals double; nasals free; premaxillary double.

I also propose to establish separate families for both *Chelys* and *Chelodina*, with the following characters :

Chelyidæ.

A strong parieto-squamosal arch. Posterior nasal openings bounded by maxillary, palate and vomer; frontals double, no free nasals; premaxillary single.

Chelodinidæ.

No parieto-squamosal arch nor supraoccipito-squamosal arch. Posterior nasal openings bounded by maxillary, palate and vomer; frontal single, nasals free; premaxillary double.*

The other genera of the *Chelyidæ*, in the sense of Boulenger, are :

Rhinemys† Wagler, 1830 = *Phrynops* Wagler, 1830 = *Hydraspis* (Blgr.) + *Rhinemys* (Blgr.).

Platemys Wagler, 1830.

* Baur, G., "The Pelvis of the Testudinata," *Journ. Morph.*, Vol. iv, 1891, p. 352.

† Baur, G., "Note on the Genera *Hydraspis* and *Rhinemys*," *Am. Nat.*, May, 1890, p. 485.

Emydura Bonaparte, 1836.*

Elseya (Gray part, 1867) Boulenger, 1899.

These I place all in one family which I call *Rhinemydidae*.

Rhinemydidae.

A slender or broad parieto-squamosal arch. Posterior nasal openings bounded by maxillary, palate and vomer; frontal double; nasals free; pre-maxillary double.

The Chelyidæ, Chelodinidæ, Rhinemydidæ and Hydromedusidæ form one natural group of the Pleurodira, which has been already established by me in 1887,† but without proper name. I propose to call it

CHELYOIDEA. ‡

Fifth and eighth cervical vertebræ biconvex; no mesoplastron; no quadratojugal; vomer present and complete.

The second group of the Pleurodira, which contains the families Pelomedusidæ and Podocnemididæ, may be called

PELOMEDUSOIDEA.

Second cervical biconvex; a mesoplastron; quadratojugal present; vomer rudimentary or absent.

Pelomedusidæ.

Quadratojugal without connection with parietals.

Pelomedusa Wagl., *Sternothærus* (Bell) Gray.

Podocnemididæ.

Quadratojugal in connection with parietals.

Podocnemis Wagler; *Peltocephalus*, Dum. and Bibr.

Erymnochelys Baur. §

Intermediate Extinct Family Bothremydidae. ||

Vomer well developed; no free nasal bones; dentaries coössified; small mesoplastron present.

January 16, 1892.

*This genus was proposed by Bonaparte, in 1836, in his *Cheloniorum Tabula Analytica*, p. 7, and not in 1838, *Arch. f. Nat.*, i, p. 140, as stated by Boulenger.

†Baur, G., "Osteologische Notizen über Reptilien," Fortsetzung, ii, *Zool. Anz.*, No. 244, 1887, p. 101.

‡In the *Zool. Anz.*, No. 285, 1888, I had given the names *Amesoplastralia* and *Mesoplastralia* to the two groups, among which I placed at this time several fossil forms which do not belong there.

§Baur, G., "The Genera of the Podocnemididæ," *Am. Nat.*, May, 1890, p. 483 (*Zool. Anz.*, No. 285, 1888; No. 296, 1888).

||Baur, G., "Notes on Some Little Known American Fossil Tortoises," *Phila. Ac. Nat. Sci.*, 1891, p. 424.

II. NOTES ON SOME TYPES OF THE TESTUDINATA COLLECTED BY SPIX AND PRESERVED IN THE ZOÖLOGICAL MUSEUM AT MUNICH.

Rhinemys.—In my note on the genera Hydraspis and Rhinemys (*Am. Naturalist*, May, 1890), I have stated that the number of the neuralia in *Rhinemys rufipes* Spix, the type of Rhinemys, was not yet known. I have now examined the type specimen and have found that the number is seven. All the pleuralia 1-7 are separated by the neurals; the pleuralia 8 alone are in contact.

Emys erythrocephala Spix, 1824.

An examination of the type specimen shows that this species is identical with *Podocnemis unifilis* Troschel, 1848; the name *Podocnemis erythrocephala* has therefore to be used.

Emys amazonica Spix, 1824.

This species is nothing but the *Podocnemis sextuberculata* Cornalia and the *Bartlettia pitipii* Gray, and the name *Podocnemis amazonica* has to be used therefor. The skull shows so considerable differences from the other species of *Podocnemis* that it seems justified to accept Gray's generic term *Bartlettia* for this form.

The type specimen has six neuralia; in the specimen figured by Boulenger seven are present.

I have to state here that these facts were fully brought out already by the late Prof. v. Siebold. The labels written by him give Spix's original names and Troschel's and Gray's names are added respectively.

I am greatly indebted to Prof. R. Hertwig for the permittance to examine these interesting types and to Inspector Will for assistance given during the examination.

MÜNCHEN, August 1, 1892.

III. THE GENERA OF THE TRIONYCHIDÆ.

The generic name *Trionyx* was established by E. Geoffroy St. Hilaire in 1809* (or 1808†). Schweigger‡ had introduced the name *Amyda* in a MS. handed to the French Institut in 1809.

Geoffroy mentions the following species:

Trionyx subplanus Geoffr.

“ *egyptiacus* Geoffr., *Testudo triunguis* Forskal.

“ *stellatus* Geoffr., *Testudo cartilaginea* Boddaert.

“ *carinatus* Geoffr., one of the American species.

* Geoffroy St. Hilaire, E., “Mémoire sur les Tortues molles, nouveau genre sous le nom de *Trionyx* et sur la formation des Carapaces,” *Ann. Mus. Paris*, xiv, 1809, pp. 1-20, Pl. 1-5

† Geoffroy St. Hilaire, E., “Sur les tortues molles,” *Paris Soc. Phil. Bull.*, i, 1808, pp. 363-367 (not seen).

‡ Schweigger, “Prodromus monographiæ Cheloniorum,” *Königsberger Archiv. für Naturw. and Math.*, Bd. i, Königsberg, 1812, pp. 271, 272.

Trionyx javanicus Geoffr., *Testudo cartilaginea* Boddaert.

“ *coromandelicus* Geoffr., *Testudo punctata* Lacépède.

“ *georgicus* Geoffr., *Testudo ferox* Schneider.

“ *euphraticus* Geoffr., *Testudo euphratica* Daudin.

In 1830 Wagler* divided the genus *Trionyx* Geoffr. into two genera—*Trionyx* and *Aspidonectes*.

Aspidonectes is thus characterized: “Thorax cartilagine flexibili limbat; digiti tres palmæ plantæque unguiculati;” and the following species are named: *Trionyx ægyptiacus* Geoffr., *Trionyx javanicus* Geoffr., *Testudo ferox* Penn., *Trionyx muticus* Les., *Trionyx carinatus* Geoffr.

Trionyx is characterized thus: “Thorax limbo osseo mobili auctus; digiti Aspidonectis;” and the single species *Testudo punctata* Lacép. is noted.

One year later, in 1831, Gray† divides also the genus *Trionyx* Geoffroy in two divisions—*Trionyx* and *Emyda*. Among *Trionyx* he names *T. ferox* Merr., *T. muticus* Les., *T. ægyptiacus* Geoffr., *T. indicus* Gray, *T. hurum* Gray, *T. javanicus* Geoffr., *T. subplanus* Geoffr., *T. euphraticus* Geoffr. Among *Emyda* he names *Trionyx* (*Emyda*) *punctata* Lacép.

The characters of *Trionyx* are: “The margin of the shields cartilaginous and the sternum narrow.” Those of *Emyda*: “Margin of the shield with a series of small bones in front and behind; limbs covered, when withdrawn, by the valves on the side of the sternum.”

It is evident that *Trionyx* Gray is the same as *Aspidonectes* Wagler, and *Emyda* Gray the same as *Trionyx* Wagler; the name *Emyda* Gray can therefore not be admitted. Besides the name *Emyda* had already been used by Rafinesque (*Analyse de la Nature*, Palerme, 1815, p. 75) for *Emys* Dum. A few months later Gray‡ published a “new edition” of his *Synopsis Reptilium*. He now separates *Emyda* completely as a distinct genus from *Trionyx*. Meanwhile he had seen Wagler’s paper, and he states in the Additions and Corrections, p. 78, “Dr. Wagler keeps the generic name of *Trionyx* for my *Emyda* and uses that of *Aspidonectes* for my *Trionyx*.”

In 1832, Bonaparte§ follows Wagler, using *Trionyx* and *Aspidonectes*.

In 1835, Duméril et Bibron|| propose the new names *Gymnopus* for *Aspidonectes* Wagler and *Cryptopus* for *Trionyx* Wagler, which, of course, cannot be accepted.

* Wagler, Dr. Joh., *Natürliches System der Amphibien*, München, Stuttgart und Tübingen, 1830, p. 134.

† Gray, J. E., “A Synopsis of the Species of the Class Reptilia,” pp. 18, 19, Appendix to Vol. ix of Griffith’s *Animal Kingdom*, London, 1831.

‡ Gray, John Edward, *Synopsis Reptilium; or, Short Descriptions of the Species of Reptiles*, Part i, “Cataptracta,” London, 1831, pp. 44–50.

§ Bonaparte, C. L., *Saggio d’una Distribuzione Metodica degli Animali Vertebrati a Sangue Freddo*, Roma, 1832, p. 13.

|| Duméril, M. C., et G. Bibron, *Espétologie Générale*, Paris, 1835, Vol. ii, pp. 472, 499.

Fitzinger divides, in 1836,* the genus *Trionyx* into five sections:

Section 1. *Trionyx*, s. str.

“ 2. *Aspidonectes*.

“ 3. *Platypeltis*.

“ 4. *Felodiscus*.

“ 5. *Amyda*.

The characters of *Trionyx*, s. str., are: “Ossicula marginalia distincta. Os cervicale vertebralibus conjunctum, in tota superficie rugosum. Ossa costalia postica contigua.” This section contains *T. granosus* Schweigg. (*T. punctata* Lac.).

The characters of *Aspidonectes* are: “Ossicula marginalia nulla. Os cervicale vertebralibus conjunctum, in tota superficie rugosum. Ossa costalia postica contigua.” (“Vertebralia septem; costalia utringue octo.”) This section contains *T. javanicus* Geoffr., *T. ægyptiacus* Geoffr., *T. hurum* Gray, *T. indicus* Gray.

The characters of *Platypeltis* are: “Ossicula marginalia nulla. Os cervicale vertebralibus conjunctum, in medio tantum rugosum. Ossa costalia postica contigua.” (“Vertebralia sex, costalia utringue septem.”) This section contains *T. brogniarti* Schweigg., *T. ferox* Schweigg.

The characters of *Pelodiscus* are: “Ossicula marginalia nulla. Os cervicale a vertebralibus separatum, in medio tantum rugosum. Ossa costalia postica contigua.” This section contains *T. sinensis* Wigm., *T. labiatus* Bell.

The characters of *Amyda* are: “Ossicula marginalia nulla. Os cervicale a vertebralibus separatum, in medio tantum rugosum. Ossa costalia postica interposito vertebralibus discreta.” This section contains *T. subplanus* Geoffr., *T. muticus* Lesueur, *T. euphraticus* Geoffr.

Bonaparte† follows mainly Fitzinger, but uses the generic names *Amyda* Schweigg. and *Trionyx* Wagler.

“AMYDA Schweigg.

† Ossa costalia postica contigua.

1. *Aspidonectes* Fitz.

2. *Platypeltis* Fitz.

3. *Pelodiscus* Fitz.

†† Ossa costalia postica interposito vertebralibus discreta.

4. *Amyda* Fitz.

TRIONYX Wagler.”

In 1844, Gray § gave the following synopsis of the genera:

“A. Sternum broad, with valves over the feet. The margin of the shield supported by bones.

1. *Emyda*. Head moderate, sternal callosities five

* Fitzinger, Leopold, “Entwurf einer systematischen Anordnung der Schildkröten,” *Ann. Wien. Mus.*, i, 1836, pp. 119, 120, 127.

† Bonaparte, C. L., *Cheloniorum Tabula Analytica*, Romæ, 1836.

‡ *Catalogue of the Tortoises, Crocodiles and Amphibæntians*, London, 1844, p. 46.

- B. Sternum narrow at each end. The margin of the shield expanded, flexible, thin. Sternal callosities four.
2. *Tyrse*. Head moderate, ovate, narrow in front; lips thin. Ribs eight pair, forming a disk with the vertebræ when young.
 3. *Dogania*. Head very large, dilated behind, narrow in front; lips thin. Ribs eight pair, not united in a solid disk until late in life.
 4. *Chitra*. Head dilated behind, broad and short in front; lips very large, swollen. Ribs eight pair.
 5. *Trionyx*. Head moderate, ovate, narrow in front. Ribs seven pair."

The following species are placed with the different genera :

Emyda—*E. punctata*, *E. senegalensis*.

Tyrse—*T. gangetica*, *T. javanica*, *T. perocellata*, *T. nilotica*, *T. rafeht*.

Dogania—*D. subplana*.

Chitra—*Ch. indica*.

Trionyx—*T. ferox*, *T. muticus*.

Gray did not accept Fitzinger's classification, because, he says, the characters given by him "alter with the age of the animals" (p. 50).

It may be noted here that in 1843 Fitzinger* had separated the *Aspidonectes javanicus* Wagl. under the name of *Potamochelys*, without giving any characters.

In 1854, Peters† established the genus *Cycloderma* for *Cycloderma frenatum* Peters.

The last work we may mention, before discussing the question, is that of Agassiz.‡

He retains the following genera :

Trionyx Wagler (*Emyda* Gray).

Chitra Gray.

Dogania Gray.

Cycloderma Peters.

Aspidonectes Wagl. (*Tr. javanicus*, *T. ægyptiacus*, *T. spinifer*, *A. asper*, *A. nuchalis*, *A. emoryii*).

Platypeltis Fitz. (type, *Tr. ferox* Schweigger, *Tr. gangeticus* Cuv.).

Ambyda Ag. (type, *T. muticus* Les.).

It is now the time to discuss the value of the different genera proposed. There is no doubt about *Trionyx* Wagler, for this genus has to stand with *Testudo punctata* Lacép. as the type; *Emyda* Gray and *Cryptopus* D. et B. are synonyms of it.

* Fitzinger, L., *Systema Reptilium Vindobanæ*, 1843, p. 30.

† Peters, W., "Ueber die auf seiner Reise nach Mosambique beobachteten Schildkröten," *Berl. Acad. Monatsb.*, 1854, pp. 215, 216.

‡ Agassiz, Louis, *Contributions to the Natural History of the United States*, Vol. i, Boston, 1857, pp. 394-397.

The question now is, What is the type of *Aspidonectes* Wagler?

Since *Aspidonectes javanicus* = *Testudo cartilaginea* Bodd. is fully figured by Wagler, Pl. ii, Figs. 1-12, and this species is also placed in *Aspidonectes* Fitzinger, I consider it as the type of *Aspidonectes*.

Besides this species, three others are mentioned by Fitzinger with *Aspidonectes* :

T. aegyptiacus Geoffroy = *Testudo triunguis* Forskal.

T. hurum Gray.

T. indicus Gray.

None of these belong to *Aspidonectes*.

Aspidonectes contains besides the type, *Trionyx formosus* Gray and *Trionyx phayrei* Theob.

Aspidonectes Wagl. may be characterized thus :

Posterior nares reduced in size by the inner and posterior extension of the maxillaries. Alveolar surface of lower jaw with a strong longitudinal symphyseal ridge (*vide* Boulenger). Eight pairs of pleuralia, last pair in contact in the median line; a single neural between the first pair of pleurals.

1. Type, *Testudo cartilaginea* Boddaert.

2. *Trionyx formosus* Gray.

3. *Trionyx phayrei*, Theob.

The genus *Platypeltis* was established by Fitzinger for *T. brogniarti* Schweigg. and *T. ferox* Schweigg. Agassiz retains the genus *Platypeltis* with *Testudo ferox* Schweigg. as type. But the species considered as *Testudo ferox* Schweigger, by Agassiz, does not represent this species at all, but a new one, which I have called *Platypeltis agassizii*;* and this species belongs to a different genus than *Platypeltis* Fitz.

The *Platypeltis* Fitzinger is the same as *Aspidonectes* Agassiz. The type of *Platypeltis* Fitzinger is *Testudo ferox* Schneider. To this genus belong the following American species :

Trionyx spiniferus Les.

Aspidonectes asper Ag.

“ *nuchalis* Ag.

“ *emoryii* Ag.

The genus *Platypeltis* Fitzinger (name only) may be characterized in this way : Posterior nares not reduced in size by the inner and posterior extension of the maxillaries. Alveolar surface of lower jaw without a longitudinal symphyseal ridge; seven or eight pairs of pleuralia, last pair in contact in the median line; a single neural between the first pair of pleurals.

The question now is, To what genus does the form belong described by Agassiz as *Platypeltis ferox* and named by me *Platypeltis agassizii*? By

*Baur, G., "Notes on the American Trionychidæ," *Am. Nat.*, Dec., 1888, pp. 1121, 1122.

the study of different skulls I have found that this species *Aspidonectes* has to be associated with *Trionyx triunguis*, *T. sinensis*, *T. californianus*, *T. swinhoei* and *T. euphraticus*.

The following generic names have been applied to these forms since Fitzinger, in 1836, besides the many names given by Heude :

Pelodiscus Fitzinger, 1836 (*T. sinensis* Wieg., *T. labiatus* Bell), =
Amyda Fitz., 1836 (*T. euphraticus*, *T. triunguis*).

Tyrse Gray, 1844 (*T. triunguis*, *T. sinensis*, *T. euphraticus*).

Rafetus Gray, 1864 (*T. euphraticus*).

Landemania Gray, 1869 (*T. sinensis*).

Fordia Gray, 1869 (*T. triunguis*).

Potamochelys Gray, 1870 (*T. sinensis*).

Oscaria Gray, 1873 (*T. swinhoei*).

Of all these, *Pelodiscus* is the oldest, and I shall therefore introduce it again.

Pelodiscus Fitzinger (name only).

Posterior nares reduced in size by the inner and posterior extension of the maxillaries. Alveolar surface of lower jaw without longitudinal symphyseal ridge ; seven to eight pairs of pleuralia, last pair in contact in the median line ; a single neural between the first pair of pleurals.

Type, *Aspidonectes sinensis*, Wieg.

Other species : *P. triunguis* Forsk.

P. swinhonis Gray.

P. euphraticus Daud.

P. agassizii Baur.

P. californianus Rivers.

The genus *Amyda* Fitz. contains the three species *Trionyx cartilagineus*, *T. muticus* and *T. euphraticus*. Of these, *T. euphraticus* has already been placed in *Pelodiscus*.

The *Trionyx cartilagineus* was placed in a special genus by Gray, with the name *Dogania*, in 1844. *Trionyx muticus* was kept in *Amyda* by Agassiz, in 1857. Both these genera have to be retained, each with a single species.

Dogania Gray, 1844.

Posterior nares reduced in size by the inner extension of the maxillaries. Alveolar surface of lower jaw without a longitudinal symphyseal ridge ; eight pairs of pleuralia, all separated by neurals ; a single neural between the first pair of pleurals.

Type, *Trionyx subplanus* Geoffr.

Amyda Fitzinger, 1836 (name only), Agassiz, 1857.

Posterior nares not reduced in size by the inner extension of the maxillaries. Alveolar surface of lower jaw without a longitudinal symphys-

cal ridge; seven to eight pairs of pleuralia, all separated by neurals; a single neural between the first pair of pleurals.

Type, *Trionyx muticus* Les.

There is one group left, consisting of three species, which cannot be united with any of the preceding genera, but which come nearest to *Aspidonectes* and to *Pelodiscus*. This group consists of the *Trionyx gangeticus* Cuvier, *Trionyx leithii* Gray and *Trionyx hurum* Gray. I shall use the generic name *Isola* for this group proposed by Gray in 1873 for *Trionyx leithii*.

Isola Gray.

Posterior nares reduced in size by the inner extension of the maxillaries. Alveolar surface of lower jaw without a strong longitudinal symphyseal ridge; eight pairs of pleuralia, the posterior ones meeting in the middle line; two neurals between the first pair of pleurals.

Type, *Trionyx leithii* Gray.

The *Trionyx indicus* Gray, placed by Fitzinger with *Aspidonectes*, has been separated by Gray as long ago as 1844 under the generic name of *Chitra*. This genus, as well as *Pelochelys* Gray (1864), *Cycloderma* Peters (1854) and *Cyclanorbis* Gray (1852), I accept in the way as they have been used by Boulenger in the *British Museum Catalogue*.

I give now a table of the different genera, with the type species and their original locality, and also the names of the other species with their original localities.

Trionyx Geoffr., 1809 (name), Wagler (*Emyda* Boul.).

1. Type, *Testudo punctata* Lacépède, 1788.
Exact locality of type not known, India.
2. *Trionyx vitatta* Peters, 1854.
Locality of type, Goa, West Coast of British India.
3. *Trionyx scutata* Peters, 1868.
Locality of type, Pegu, British India.

Cycloderma Peters, 1854.

1. Type, *Cycloderma frenatum* Peters, 1854.
Locality of type, Zambesi river, East Africa.
2. *C. aubryi* A. Dum., 1856.
Locality of type, Gaboon, West Africa.

Cyclanorbis Gray, 1852.

1. Type, *Cryptopus senegalensis* Dum. et Bibr., 1835.
Locality of type,* Senegal, West Africa.
2. *C. elegans* Gray, 1869.
Locality of type, West Africa.

*The real type of *Cyclanorbis* is *Cyclanorbis petrsii* Gray, 1852, from Gambia.

Aspidonectes Wagler, 1830 (name), *Aspidonectes* Fitzinger (part.) (*Trionyx*, i, B. 2, Boulenger).

1. Type, *Testudo cartilaginea* Boddaert, 1770.
Locality of type, Java.
2. *A. formosus* Gray, 1869.
Locality of type, Pegu.
3. *A. phayrei* Theobald, 1868.
Locality of type, Araccan range, west of Pegu.

Platypeltis Fitzinger, 1836 (name) (*Trionyx*, ii, Boulenger, part.).

1. Type, *Testudo ferox* Schweigger.
Locality of type, Savannah river, Ga.
2. *P. spinifer* Les.
Locality of type, Wabash river, Ind.
3. *P. asper* Ag.
Locality of type, Lake Concordia, La.
4. *P. nuchalis* Ag.
Locality of type, Cumberland river, Tenn.
5. *P. emoryii* Ag.
Locality of type, Lower Rio Grande river, Texas, near Browns ville.

Pelodiscus Fitzinger, 1836 (name) (*Trionyx*, i, B. 3, Boulenger, part.).

1. Type, *Aspidonectes sinensis* Wiegman, 1834.
Locality of type, near Makao.
2. *P. swinhoei* Gray, 1873.
Locality of type, Shanghai.
3. *P. euphraticus* Daudin, 1802.
Locality of type, Euphrates.
4. *P. triunguis* Forskal, 1775.
Locality of type, Nile.
5. *P. agassizii* Baur, 1886.
Locality of type, Western Georgia.
6. *P. californianus* Rivers.
Locality of type, Sacramento river, near Sacramento, Cal.

Dogania Gray, 1844 (*Trionyx*, i, A., Boulenger).

1. Type *Trionyx subplanus* Geoffr., 1809.
Locality of type, probably, Ganges.

Amyda Fitzinger, 1836 (name), Agassiz, 1857.

1. Type, *Trionyx muticus* Les., 1827.
Locality of type, Wabash river, Ind.

Isola Gray, 1873 (*Trionyx*, ii, B. 1, Boulenger).

1. Type, *Trionyx leithii* Gray.
Locality of type, Poonah.

2. *I. gangetica* Cuv.

Locality of type, Ganges.

3. *I. hurum* Gray, 1837.

Locality of type, Ganges (probably).

Chitra Gray, 1844.1. Type, *Trionyx indicus* Gray, 1831.

Locality of type, Ganges, Pinang.

Pelochelys Gray, 1864.1. Type, *Pelochelys cantorii* Gray, 1864.

Locality of type, Pinang.

2. *P. cummingii* Gray, 1864.

Locality of type, Philippines.

3. *P. poljakowii*, Strauch.

Locality of type, Fu-tschan.

It may be seen that in the circumscription of the species I have nearly completely followed Boulenger. This, however, is only provisional. I am fully convinced that Boulenger has gone too far in contracting species. This I may especially say in regard to his *Trionyx sinensis*, *triunguis* and *subplanus*. Further detailed studies have to decide about this question.

I do not believe at all that the system proposed here is finished; but I think that it gives a more correct idea of this difficult group of tortoises. Much remains to be done yet for an exact knowledge of the Asiatic and African forms. But it is only by an exhaustive study of the osteological characters that any light can be brought here.

January 15, 1892.

IV. THE SPECIES OF THE GENUS PSEUDEMYIS.

The genus *Pseudemys* was established by Gray* in 1855. The species referred to it were *Testudo concinna* LeC., *Emys hieroglyphica* Holbr. (*Pseudemys* (?) *hieroglyphica* Gray) and *Testudo rubiventris* LeC. (*Pseudemys serrata* Gray). Two years later, Agassiz † gave the generic name *Ptychemys* to the same group, distinguishing the following species:

Ptychemys rugosa Ag. (*Testudo rubiventris* LeC.).“ *concinna* Ag.“ *mobiliensis* Ag.“ *hieroglyphica* Ag.“ *decussata* Ag.

It is evident that *Ptychemys* Ag. is a synonym of *Pseudemys* Gray. As the type of this genus I consider *Testudo concinna* LeC.

* Gray, J. E., *Catal. Shield Rept. Coll. Brit. Mus.*, Part i, “Testudinata,” London, 1855.† Agassiz, Louis, *Contrib. Nat Hist. Un. States*, Vol. i, Boston, 1857.

Pseudemys concinna LeC., Gray.

This species was described by LeConte* under the name of *Testudo concinna* LeC. LeConte says: "Inhabits the rivers of Georgia and Carolina, where the beds are rocky. I have never seen them below Augusta on the Savannah, or Columbia on the Congaree." We have therefore to consider specimens from these localities as typical.

The upper jaw in this species is smooth, not notched, and without lateral cusps; the lower jaw is serrated and has a sharp median cusp on the symphysis. This species is characterized by its broad and low shell and its small head.

Pseudemys hieroglyphica Holbrook.

This species was described by Holbrook, in 1836, in the first edition of his *Herpetology* (Vol. i, p. 47, Pl. ii). The type now in the collection of the Philadelphia Academy came from the Cumberland river, Tenn.

A species very close to *Pseudemys concinna* LeConte, but distinguished by its elongated, narrow shell and its head, which is still smaller. The yellow stripes and dots on the head and neck are also very much more expressed than in *Pseudemys concinna* LeConte.

Pseudemys labyrinthica Lesueur, MSS., C. Duméril.

Boulenger places this species as a synonym of *Malaclemys geographica*, but there cannot be any doubt that it belongs to *Pseudemys*. It was originally described by C. Duméril, in *Catalogue méthodique de la Collection des Reptiles*, Paris, 1851, p. 13. The type specimens collected by Lesueur came from the Wabash river, Ill., probably from New Harmony.

That it cannot be *Malaclemys geographica* is at once seen from the description of the jaws: "Mâchoire inférieure dentelée, munie à son extrémité antérieure d'un crochet venant se loger dans une petite échancrure de la supérieure." Duméril correctly compares it with *P. hieroglyphica* Holbr., and says: "Cette E. diffère de la précédente [hieroglyphica] par la forme de sa carapace, dont l'ovale est moins allongé, et par l'élévation quelle présente sur la ligne vertébrale, qui est au contraire déprimée dans l'E. hiéroglyphique, et enfin par le volume proportionnellement plus considérable de la tête."

This species shows the coloration of head and neck of *P. hieroglyphica*, but the head is larger and the shell more as in *P. mobiliensis*, but by far not so large.

I have examined two heads of this form, from Illinois, preserved in alcohol; it is mentioned as *Pseudemys concinna* LeC. by H. Garman in "Notes on Illinois Reptiles and Amphibians" (*Illinois State Laboratory of Nat. Hist.*, pp. 185, 186). This species is said to be found at Mt. Carmel, Ill.

* LeConte, J., "Description of the Species of North American Tortoises," *Ann. Lyc. Nat. Hist.*, New York, Vol. iii, Febr., 1830.

Pseudemys floridana LeC.

In 1830, LeConte described a tortoise from the St. John's river, in East Florida, under the name of *Testudo floridana*. This species was recognized as distinct by Holbrook, in 1842, and figured (Pl. viii). Agassiz stated that it has to be considered a synonym of *P. concinna* LeC., and it seems that all recent authors have followed him.

There is no doubt that this species is distinct from *Pseudemys concinna* LeC. and *P. mobiliensis* Holbr.

The description given by LeConte is very good. The species is at once distinguished by its oval form and the great elevation of the carapace and its color. The carapace is not emarginate in front. It has a very dark-brown color, with numerous irregular lines of yellow. The marginals are also dark brown and have only one vertical median yellow line and are without the yellow concentric lines so characteristic for *P. concinna* and *P. mobiliensis*. The carapace is much more arched than in *P. mobiliensis* and nearly forms a half circle. The skull is also larger than in this species and the jaws are not serrated. This species seems to be restricted to Florida and Southern Georgia.

Pseudemys texana, sp. nov.

Agassiz mentions specimens of his *Ptychemys mobiliensis* "from Guadalupe mountains, Pecos river, Texas, and New Leon, near Cadereita, Mexico," and also young specimens collected in Texas by Mr. G. Stolley.

I have examined different specimens of this so-called *Ptychemys mobiliensis*, from Texas, and reach the conclusion that it belongs to a new species of *Pseudemys* related to *P. rubiventris* LeC., which may be called *Pseudemys texana*. As typical specimen of this new species I consider a stuffed specimen, No. 246, of the Philadelphia Academy, collected by Dr. Hermann in San Antonio, Texas.

Pseudemys texana, sp. nov.

Shell very thin behind, posterior border serrated, longitudinally rugose; nuchal long and slender; upper shell brown, with yellow reticulations similar to *Pseudemys concinna*; shell not much elevated. Plastron emarginated behind, yellow or with brown markings.

Skull small, similar to *P. rubiventris*; upper jaw notched in the centre, with a rounded tooth on each side, not so prominent as in *P. rubiventris*. Lower jaw similar to *P. rubiventris*. The coloration of the head quite different from the other species. A yellow longitudinal spot behind the eye; above this, a yellow line ending in a long longitudinal spot above the temples; from the lower posterior portion of the eye a yellow line appears, sending a branch upwards in front of tympanic cavity, and continues behind on the neck. Three very strong yellow and some slender yellow stripes on lower face of neck.

Locality of type, San Antonio, Texas.

There is a shell of the same species in the Philadelphia Academy. No. 247. It has the Smithsonian Institution number 7173 and was collected near Old Fort Cobb, I. T. The soft parts, limbs and head are preserved in alcohol at the Smithsonian. The two specimens mentioned by Agassiz are also at the Smithsonian (No. 80, Guadalupe mountains, Pecos river, Texas, and No. 76, New Leon, near Cadereita, Mexico) and belong to this species.

I consider *Pseudemys texana* as the representative of *Pseudemys* in the southern portions of this country west of the Mississippi—Texas, Indian Territory, Northern Mexico.

Pseudemys rubiventris LeC., Baur.

This species has been first mentioned by Say,* who described it erroneously as *Emys serrata* Daudin, in 1825. LeConte† introduced it as a new species under the name of *Testudo rubiventris* LeC., the “red-bellied terrapin, vulg.” According to LeConte, it inhabits “in rivers from New Jersey to Virginia, chiefly in such as are rocky.” He says that they are very numerous in the Delaware, near Trenton; specimens from this locality may be considered as typical, therefore.

In this form both jaws, especially the lower one, are strongly serrated; the upper one is notched mesially and has a cusp on each side; the lower jaw has a strong, median, serrated cusp and a notch on each side of it.

Pseudemys alabamensis, sp. nov.

In the collection of Mr. Gustave Kohn, of New Orleans, La., I found two specimens from Mobile, Ala., which are closely allied to *P. rubiventris*. They are at once distinguished, however, by their much more arched shell. This species has been noted by Agassiz as *Ptychemys mobiliensis*. It is, however, totally different from this, having the structure of the skull of *Pseudemys rubiventris* LeC. The shell is much more arched than in *P. rubiventris*; the coloration is like that in the latter form, but the plastron is yellow, or yellow with brown reticulations or dots.

Locality of types, Mobile bay, Ala. Collection of Mr. G. Kohn, New Orleans, La. This species exists in different museums, with the name *P. mobiliensis* Holbr.

Pseudemys mobiliensis Holbr.

The types of this species are from Alabama and are Nos. 241 and 242 of the Philadelphia Academy collection. I have examined the types and found that they are very close to *P. concinna* LeC. The skull agrees exactly with that of *P. concinna*, but is considerably larger. There is no notch in the upper jaw and no lateral cusps; the lower jaw only has a

*Say, Thomas, “On the Fresh-water and Land Tortoises of the United States,” *Journ. Acad. Nat. Sc., Philad.*, Vol. iv, Part 2, 1825.

†LeConte, J., l. c.

sharp median hook, but no lateral notches. The upper jaw is very finely, the lower one strongly, serrated. A number of specimens in Mr. Kohn's collection from Mobile bay, Ala., and New Orleans, La., agree with the type.

Skull like *Pseudemys concinna* LeC., but larger; shell very much more arched, especially in front, than that of *P. concinna*; coloration as in the latter form. Animal much larger than *P. concinna*, the upper shell reaching a length of 385 mm. (over curve).

We have, therefore, the following species of *Pseudemys*:

Pseudemys concinna LeC.

“ *hieroglyphica* Holbr.

“ *labyrinthica* C. Dum.

“ *floridana* LeC.

“ *mobiliensis* Holbr.

“ *rubiventris* LeC.

“ *alabamensis* Baur.

“ *texana* Baur.

These forms can be arranged in two series.

A. Both jaws strongly and coarsely serrated; upper one notched medially, with a cusp on each side. Lower jaw with a median cusp.

1. *Pseudemys rubiventris* LeC., Baur.

Type from Delaware, near Trenton.

2. *Pseudemys alabamensis* Baur.

Syn., *Ptychemys mobiliensis* Ag. (part).

Type from Mobile bay, Ala. In the collection of Mr. G. Kohn, New Orleans, La.

3. *Pseudemys texana* Baur.

Syn., *Ptychemys mobiliensis* Ag. (part).

Type from San Antonio, Texas. No. 246 Philadelphia Academy.

B. Generally lower jaw only strongly and coarsely serrated; upper without median notch, no cusps on the sides. Lower jaw with a median cusp.

1. *Pseudemys concinna* LeC., Gray.

Type from upper parts of rivers of South Carolina and Northern Georgia.

2. *Pseudemys mobiliensis* Holbr., Baur (non Ag., non Boul.).

Type from Mobile, Ala. Philadelphia Academy, Nos. 241, 242.

Syn., *Emys orthonix* Wied.

3. *Pseudemys floridana* LeC., Baur.

Type from St. John's river, Eastern Fla.

4. *Pseudemys hieroglyphica* Holbr., Gray.

Type from Cumberland river, Tenn. No. 217, Philadelphia Academy.

5. *Pseudemys labyrinthica* (Les. MSS.) C. Dum., Gray.

Type from Wabash river, Ill. Museum Natural History, Paris.